Appendix C

TMDL Expressed in Terms of a Load (Billions of E. coli / Day)

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The following TMDLs, expressed in terms of billions of E. coli / Day, are provided to satisfy recent legal challenges that TMDLs should be expressed in terms of the maximum allowable load per day. For reasons discussed in the main text (section 5.1) however, NHDES believes that it is more useful to express the TMDL in terms of concentration (counts of E. coli/ 100 ml).

Since there are two bacteria criterion, two TMDLs are presented. Table A and Figure A show the TMDL based on the single sample criterion of 88 E. coli per 100 ml and Table B and Figure B show the TMDL based on the geometric mean criterion of 47 E. coli per 100 ml.

For each case, the TMDL is a function of flow. Formulas used to calculate the TMDL, WLA, LA and MOS are provided at the bottom of Tables A and B. In general the TMDL was set equal to the bacteria criterion multiplied by the flow and a conversion factor. The WLA was set equal to 10 percent of the TMDL. As discussed in the main text (see section 5.1), a WLA was included to account for the possibility that the NPDES MS4 General Stormwater Permit program is expanded in the future to include communities such as Troy.

For reasons discussed in the main text (see section 5.2) an implicit margin of safety was used; consequently the explicit MOS shown in Tables A and B were set equal to zero. The LA was set equal to the TMDL minus the WLA minus the MOS. At a flow equal to zero the TMDL was calculated by multiplying the volume of the Beach swimming area by the bacteria criterion and a conversion factor.

Formulas for calculating the TMDL for any flow are provided in Figures A and B. Since TMDLs are provided for all flows that could occur under any season or condition, the TMDLs are protective of water quality under all seasons and conditions.

The intent of this TMDL is not set to permit limits for any point or nonpoint discharge unless otherwise required under State law or regulation. This is especially true for stormwater discharges covered by the EPA NPDES General Stormwater Permit program. NPDES stormwater permits are BMP (best management practices) based permits which require communities to develop and implement comprehensive stormwater management programs that include BMPs. New Hampshire and EPA believe that BMP based permits that are part of a comprehensive stormwater management program, with specific emphasis given to pollutants causing or contributing to water quality problems, can be consistent with the WLAs established for stormwater discharges in TMDLs. Consequently, although end of pipe bacteria measurements can identify and help prioritize sources that require attention, compliance with this TMDL will be based on ambient water quality and not end of pipe measurements.

Table A: TMDL Based on Single Sample Bacteria Criterion

Flow (Q) (ft3/sec)	SS WQC cts/100 ml	WLA	LA (billions of organisms/day)	MOS	SS TMDL
0	88	0.017	0.157	0.000	0.174
0.5	88	0.108	0.969	0.000	1.077
1	88	0.215	1.938	0.000	2.153
2	88	0.431	3.876	0.000	4.306
3	88	0.646	5.814	0.000	6.460
4	88	0.861	7.752	0.000	8.613
5	88	1.077	9.690	0.000	10.766
10	88	2.153	19.379	0.000	21.532
20	88	4.306	38.758	0.000	43.065
50	88	10.766	96.895	0.000	107.661

WLA = Wasteload Allocation (i.e., point sources - set equal to 10% of TMDL)
LA = Load Alloction (i.e., nonpoint sources - set equal to 90% of TMDL)
MOS = Margin of Safety
For Q = 0 cfs, TMDL (billions of organisms/day) = WQC (cts/100 ml) x V (ft^3) x 1000 ml/L x 28.32 L/ft^3 / 10^9
For Q > 0 cfs, TMDL (billions of organisms/day) = WQC (cts/100 ml) x 1000 ml/L x Q (ft3/sec) x 86400 sec/day x 28.32 L/ft3 / 10^9
where: SS = Single Sample
WQC = Water Quality Criterion = 88 cts/100 ml E. coli
Q = Flow in cubic feet per second (ft^3/sec)
V = Volume of water in beach swimming area = 7000 ft^3
L = Liter

Figure A : TMDL Based on Single Sample Bacteria Criterion

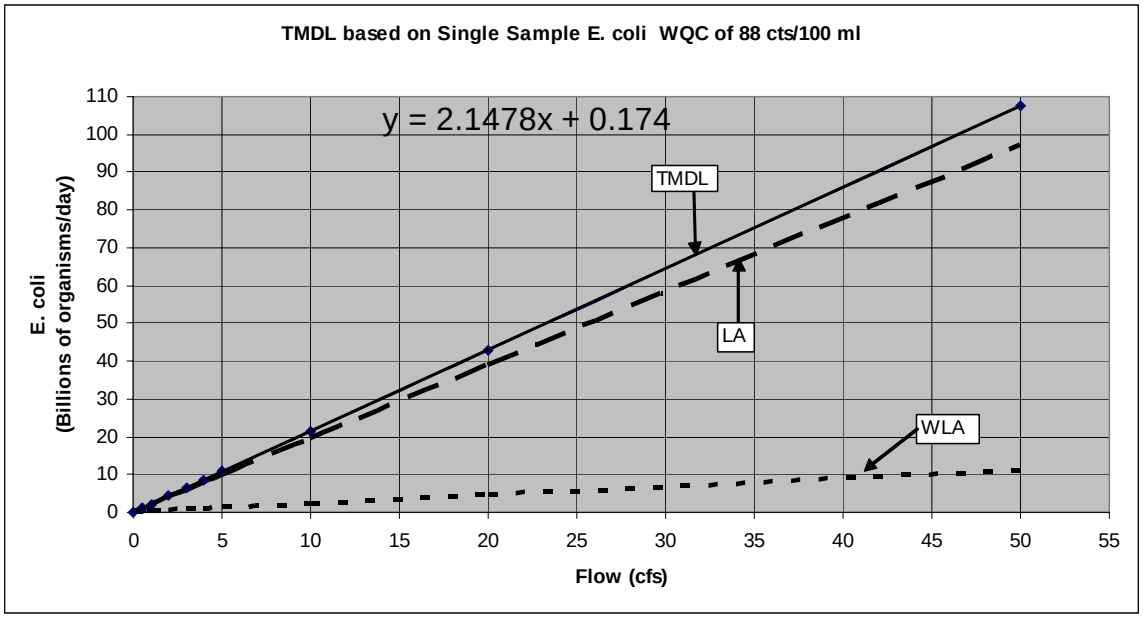

Table B: TMDL Based on Geometric Mean Bacteria Water Quality Criterion

Flow (Q) (ft3/sec)	GM WQC cts/100 ml	WLA	LA (billions of organisms/day)	MOS	GM TMDL
0	47	0.009	0.079	0.000	0.087
0.5	47	0.058	0.518	0.000	0.575
1	47	0.115	1.035	0.000	1.150
2	47	0.230	2.070	0.000	2.300
3	47	0.345	3.105	0.000	3.450
4	47	0.460	4.140	0.000	4.600
5	47	0.575	5.175	0.000	5.750
10	47	1.150	10.350	0.000	11.500
20	47	2.300	20.700	0.000	23.000
50	47	5.750	51.751	0.000	57.501

WLA = Wasteload Allocation (i.e., point sources - set equal to 10% of TMDL)
LA = Load Alloction (i.e., nonpoint sources - set equal to 90% of TMDL)
MOS = Margin of Safety
For Q = 0 cfs, TMDL (billions of organisms/day) = WQC (cts/100 ml) x V (ft^3) x 1000 ml/L x 28.32 L/ft^3 / 10^9
For Q > 0 cfs, TMDL (billions of organisms/day) = WQC (cts/100 ml) x 1000 ml/L x Q (ft3/sec) x 86400 sec/day x 28.32 L/ft3 / 10^9
where: GM = Geometric Mean
WQC = Water Quality Criterion = 47 cts/100 ml E. coli
Q = Flow in cubic feet per second (ft^3/sec)
V = Volume of water in beach swimming area = 7000 ft^3
L = Liter

Figure B: TMDL Based on Geometric Mean Bacteria Water Quality Criterion